obtained by encoding motion vectors of respective blocks obtained by partitioning each frame of moving image data, comprising:

predicting means for predicting a motion vector of a target block based on motion vectors of a plurality of blocks adjacent to the target block;

determining means for determining accuracy of a prediction made by said predicting means based on the plurality of motion vectors; and

decoding means for decoding the motion vector of the target block by using a result of the prediction made by said predicting means with a decoding method determined based on a result of a determination made by said determining means.

22. (New) A motion vector decoding method for decoding a result of encoding obtained by encoding motion vectors of respective blocks obtained by partitioning each frame of moving image data, comprising:

predicting a motion vector of a target block based on motion vectors of a plurality of blocks adjacent to the target block;

determining accuracy of a prediction based on the plurality of motion vectors; and

decoding the motion vector of the target block by using a result of the prediction with a decoding method determined based on a result of a determination of the accuracy of the prediction.

REMARKS

In the Office Action mailed August 16, 2002 the Examiner noted that claims 1-13 were pending, objected to claims 5 and rejected claims 1-4 and 6-13. Claim 5 has been amended, claims 1-4 and 6-10 have been canceled, new claims 14-22 have been added and, thus, in view of the forgoing claims 5 and 11-22 remain pending for reconsideration which is requested. No new matter has been added. The Examiner's rejections and objections are traversed below.

The Examiner has objected to the specification and the specification has been amended in consideration of the Examiner's comments. Withdrawal of the objection is requested.

In the Office Action the Examiner objected to claims 5 and indicated that claim 5 would be allowable if rewritten in independent form. Claim 5 has been so rewritten and it is submitted that claim 5 is now allowable. Withdrawal of the objection is requested.

Page 3 of the Office Action rejects claims 3-4 under 35 U.S.C. § 103 over Lynch (5,198,901) in view of Ueno (4,951,140). Claims 3 and 4 have been canceled.

On page 2 of the Office Action the Examiner rejected claim 1-2 and 6-13 under 35 U.S.C. § 102 as anticipated by Lynch (5,198,901).

Lynch is directed to a system that uses a motion compensator 68, as particularly noted by the Examiner. As discussed by Lynch starting in col. 7 at line 55 through col. 19, line 29, the motion compensator 68 is used in a process for forming what is called a B-frame from I and P frames on either side of the B frame. The process of forming the B frame involves selecting a mode. Mode selection involves a motion estimator 67 providing motion estimates to select forward and backward predicted motion blocks that are used to form an interpolative predicted motion block. An input motion block is compared to the forward, backward and interpolative motion blocks and an error is determined. The error is used to select a predicted motion block to supply to the motion compensator. The selection of the block also specifies the mode. The mode information tells a receiver which mode was used to code the B frame when it was coded.

In contrast, the present invention is directed at an approach to decoding a motion vector in which a prediction for the vector is made based on neighboring motion vectors. The accuracy of the prediction is determined by examining the non-uniformity of the vectors used to make the prediction. The predicted vector and the accuracy of the predicted vector are used to decode the motion vector. See claims 11-13. Lynch teaches and suggests nothing with respect to these features of the present invention. Ueno adds nothing to Lynch with respect to these features.

It is submitted that the present claimed invention patentably distinguishes over Lynch (and Ueno) and withdrawal of the rejection is requested.

New claims 14-19 depend from claim 11, 12 or 13 and are patentable for the reasons set forth above. In addition, these claims recited additional features of the decoding approach that are not taught or suggested by the prior art.

New claims 20-22 emphasize the decoding based on the determination of the accuracy of a predicted vector as discussed above. Nothing in the prior art teaches or suggests such. These claims are also patentable for the reasons set forth above. It is submitted that these new claims distinguish over the prior art.

It is also submitted that claim 5 continues to be allowable. It is further submitted that the claims 11-22 are not taught, disclosed or suggested by the prior art. The claim is therefore in a condition suitable for allowance. An early Notice of Allowance is requested.

If any further fees, other than and except for the issue fee, are necessary with respect to this paper, the U.S.P.T.O. is requested to obtain the same from deposit account number 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: 2-19-03

By: John C. Garvey

John C. Garvey
Registration No. 28,607

700 Eleventh Street, NW, Suite 500
Washington, D.C. 20001
(202) 434-1500

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please AMEND the paragraph beginning at page 1, line 18, as follows:

As a high efficiency coding method for moving image data, an interframe predictive coding is known. This coding method takes advantage of the nature that the degree of correlation of moving image data is high in a time direction. Namely, the degree of similarity between frame data of moving image data at certain timing and that at the next timing is normally high in many cases. Therefore, the interframe predictive coding utilizes this nature. For example, in a data transmission system using the interframe predictive coding, a transmitting device generates motion vector data which represents a motion from an image in a preceding frame to an image in a target frame, and [differentce] difference data (predictive error) between a predicted image in the target frame, which is generated from the image in the preceding frame by using the motion vector data, and an image in the target frame. The transmitting device then outputs the motion vector data and the difference data to a receiving device. The receiving device reproduces the image in the target frame from the received motion vector data and difference data.

IN THE CLAIMS:

Please CANCEL claims 1-4 and 6-10

Please AMEND the following claims:

5. (ONCE AMENDED) A motion vector encoding device for encoding motion vectors of respective blocks obtained by partitioning each frame of moving image data, comprising:

predicting means for predicting a motion vector of a target block based on motion vectors of a plurality of blocks adjacent to the target block;

determining means for determining accuracy of a prediction made by said predicting means based on degrees of non-uniformity of the plurality of motion vectors; and

encoding means for encoding the motion vector of the target block using a result of the prediction made by said predicting means with an encoding method determined based on a result of a determination made by said determining means, and [The motion vector encoding device according to claim 1,] wherein:

said predicting means comprises first and second predicting means for respectively predicting first and second components of the motion vector of the target block;

said determining means comprises

first determining means for determining the accuracy of the prediction made by said first predicting means based on degrees of non-uniformity of respective first components of the plurality of motion vectors, and

second determining means for determining the accuracy of the prediction made by said second predicting means based on degrees of non-uniformity of respective second components of the plurality of motion vectors, a first component of the motion vector of the target block, and the respective first components of the plurality of motion vectors; and

said encoding means comprises

first encoding means for encoding the first component of the motion vector of the target block by using a result of a prediction made by said first predicting means with an encoding method determined based on a result of a determination made by said first determining means, and

second encoding means for encoding the second component of the motion vector of the target block by using a result of a prediction made by said second predicting means with an encoding method determined based on a result of a determination made by said second determining means.

Please ADD the following claims:

14. (New) The motion vector decoding device according to claim 11, wherein said determining means determines the accuracy of the prediction made by said predicting means based on the degrees of non-uniformity of the plurality of motion vectors which have already been decoded in an area adjacent to the target block.

15. (New) The motion vector decoding device according to claim 12, wherein said determining means determines the accuracy of the prediction made by said predicting means based on the degrees of non-uniformity of the plurality of motion vectors which have already been decoded in an area adjacent to the target block.

16. (New) The motion vector decoding device according to claim 13, wherein said determining means determines the accuracy of the prediction made by said predicting means based on the degrees of non-uniformity of the plurality of motion vectors which have already been decoded in an area adjacent to the target block.

17. (New) The motion vector decoding device according to claim 11, wherein said encoding means comprises:

a plurality of individual decoding means for decoding the motion vector of the target block with unique decoding methods; and

selecting means for selecting one of said plurality of individual decoding means based on the result of the determination made by said determining means, and for outputting a result of decoding performed by the selected individual decoding means.

18. (New) The motion vector decoding device according to claim 12, wherein said encoding means comprises:

a plurality of individual decoding means for decoding the motion vector of the target block with unique decoding methods; and

selecting means for selecting one of said plurality of individual decoding means based on the result of the determination made by said determining means, and for outputting a result of decoding performed by the selected individual decoding means.

19. (New) The motion vector decoding device according to claim 13, wherein said encoding means comprises:

a plurality of individual decoding means for decoding the motion vector of the target block with unique decoding methods; and

selecting means for selecting one of said plurality of individual decoding means based on the result of the determination made by said determining means, and for outputting a result of decoding performed by the selected individual decoding means.

20. (New) A motion vector decoding device for decoding an output of a motion vector encoding device which predicts a motion vector of a target block based on motion vectors of a

plurality of blocks adjacent to the target block, determines accuracy of a prediction based on a plurality of motion vectors which have already been encoded in an area adjacent to the target block, and encodes the motion vector of the target block by using a result of the prediction with an encoding method determined based on a result of a determination of the accuracy of the prediction, in order to encode motion vectors of respective blocks obtained by partitioning each frame of moving image data, comprising:

predicting means for predicting the motion vector of the target block based on the plurality of motion vectors used to make the determination within the motion vector encoding device;

determining means for determining accuracy of a prediction made by said predicting means based on the degrees of non-uniformity of the plurality of motion vectors; and

decoding means for decoding the motion vector of the target block by using a result of the prediction made by said predicting means with a decoding method determined based on a result of a determination made by said determining means.

21. (New) A motion vector decoding device for decoding an encoding result which is obtained by encoding motion vectors of respective blocks obtained by partitioning each frame of moving image data, comprising:

predicting means for predicting a motion vector of a target block based on motion vectors of a plurality of blocks adjacent to the target block;

determining means for determining accuracy of a prediction made by said predicting means based on the plurality of motion vectors; and

decoding means for decoding the motion vector of the target block by using a result of the prediction made by said predicting means with a decoding method determined based on a result of a determination made by said determining means.

22. (New) A motion vector decoding method for decoding a result of encoding obtained by encoding motion vectors of respective blocks obtained by partitioning each frame of moving image data, comprising:

predicting a motion vector of a target block based on motion vectors of a plurality of blocks adjacent to the target block;

determining accuracy of a prediction based on the plurality of motion vectors; and

decoding the motion vector of the target block by using a result of the prediction with a decoding method determined based on a result of a determination of the accuracy of the prediction.